Rev. 9/98

Bridge No. _____

Job No. _____

Missouri Department of Transportation

Culvert Hydraulics Report

Designer _____ Date _____

Route _____ County _____ Stream _____

Purpose of Hydraulic Study

(write a brief statement describing project and purpose of hydraulic study)

National Flood Insurance Program Information

Has a flood insurance study been performed for the community? *(www.fema.gov/home/fema/csb.htm)*

Is the culvert in a special flood hazard area? *(If yes, a floodplain development permit will be required)*

Is the culvert in a designated floodway? *(If yes, a no-rise certification will be required)*

Has a Flood Insurance Rate Map (FIRM) been published for the area?

What is the insurance rating for the site (A1, B, C, etc.)?

Base (100-yr) Flood Elevation _____ Floodway width _____

Map panel number _____ Map date _____

Additional comments on Flood Insurance Study:

Design Flow

Design Frequency _____ (years) Drainage Area _____ (km^2)

Avg. slope between points 10% and 85% of valley length upstream _____ (m/km)

Method of Analysis (choose one or more)			**Q_{des}**	**Q_{500}**
Missouri Rural USGS regression equations	Region =			
Missouri Urban (BDF) regression equations	BDF =			
Missouri Urban (%I) regression equations	% Impervious Area =			
Stream Gage	USGS Station Number =			
FEMA Flood Insurance Study	Community Name =			
Other (Describe method)				

Design Flow _____ (m^3/s) 500-year flow _____ (m^3/s)

Additional comments on design flow calculations: (method chosen and why, expected level of upstream development, etc. Note: Include 100-year discharge if Design Frequency is not 100-year)

Observed Extreme High Water

Elevation _____ (m) Location _____ Date _____

Comments on Observed Extreme High Water: *(discharge, if known, etc.)*

Discuss flow conditions in reach and describe any existing conditions that may influence hydraulic behavior in reach:

Model used:

☐ HY-8 ☐ Other (describe) _____

Model data:

Streambed Slope = _____ (m/m)

How was streambed slope determined?

Which cross section was used to determine high water surface elevations and why?

Which cross section was used to determine tailwater elevations and why?

Describe the channel/overbank conditions and the roughness coefficients chosen:

Culvert Geometry

Inlet Flowline Elevation _____ Outlet Flowline Elevation _____

Span _____ (m) Rise _____ (m) Number of Barrels _____ Length (headwall to headwall) _____ (m)

Additional comments on Culvert Geometry:

Inlet configuration

☐ Straight Wings ☐ Flared Wings ☐ Improved Inlet (describe) _____

Additional Comments on Inlet Configuration:

Filenames

Describe files used in culvert calculations: *(Hy-8 filenames and descriptions, etc.)*

Culvert Calculation Results

	Existing Conditions		Proposed Conditions	
	Design Flow	**Q_{500}**	**Design Flow**	**Q_{500}**
High Water Surface Elevation at Culvert (m)	N/A	N/A		
Allowable Headwater Elevation (m)	N/A	N/A		N/A
Culvert Operating Elevation				
Backwater (m)				
Inlet or Outlet Control				
Culvert Outlet Velocity (m/s)				
Tailwater Depth (m)				
Tailwater Velocity (m/s)				
% of flow overtopping road				

Overtopping Discharge _____ (m^3/s) Overtopping Frequency _____ (year)

Additional comments on culvert calculations: *(backwater, velocities, unusual conditions, comparison to observed high water data, etc. Note: Provide high water surface elevation and maximum backwater for the 100-year discharge if Design Frequency is not 100-year.)*

Scour Protection Measures

General Scour Information: *(Describe soil conditions in streambed and overbanks:)*

What measures are required to protect against scour?

Additional comments on scour protection:

General Information

Are there any improvements/buildings/crops/livestock that might be affected by alterations to the floodplain?
(include description and estimated value)

Special Considerations: *(Describe any other special conditions or considerations which affect this project)*

Culvert Layout Summary

Culvert Layout _____

Loading _____ Roadway Width _____ Skew Alignment

Fill exception: Sta. _____ To Sta. _____

Design Variances: *(Provide an explanation of any design variances requested and approved for this project)*

Hydraulic Analysis Summary

Design Flood Data:

Design Frequency _____ Design Discharge _____ (m^3/s)

Design High Water Surface Elevation _____ (m) Backwater _____ (m)

Waterway Area below D.H.W. _____ (m^2) Average Velocity thru Opening _____ (m/s)

Basic (100 yr.) Flood Data (if design flood other than 100 year):

Discharge _____ (m^3/s) Water Surface Elevation _____ (m)

Backwater _____ (m)

Overtopping Discharge Data:

Overtopping Discharge _____ (m^3/s) Overtopping Frequency _____ (year)